

Question 40 (Answer: **D**)

- Let the ^{24}Mg abundance be $x\%$; the other two share $(100 - x)$ equally, so each is $(100 - x)/2$.
- Their average mass is 25.5, so $24x + 25.5(100 - x) = 2430$.
- $-1.5x = -120$, giving $x = 80\%$.

Question 40 (Answer: **B**)

- Gallium has 31 protons, so the two isotopes are ^{69}Ga and ^{71}Ga .
- $A_r = (6 \times 69 + 4 \times 71)/10 = 69.8$.
- $= 69.8$.

1(a)(i)	24 protons 28 neutrons 24 electrons
1(a)(ii)	(^{54}Cr has two) more neutrons (than ^{52}Cr)
1(a)(iii)	(relative) abundance (of each isotope)
1(a)(iv)	The fourth isotope has any value of RIM less than 51.996
1(b)(i)	$1s^2 2s^2 2p^6 3s^2 3p^6 (3d^5 4s^1)$
1(b)(ii)	6
1(c)(i)	$\text{Cr} / \text{Cr}_2\text{O}_7^{2-}$ AND it gains electrons
1(c)(ii)	(+)4
1(c)(iii)	<i>Due to an issue with question 1(c)(iii), the question has been removed from the question paper.</i>
1(c)(iv)	M1 CO_2 has only instantaneous / temporary dipole–induced dipole forces AND methanal has permanent dipole–permanent dipole (and id-id) forces M2 IMF's in methanal are stronger than IMF's in CO_2
1(d)(i)	rate of forward and backward (reaction) are the same / equal OR concentrations of reactants and products are constant
1(d)(ii)	closed system
1(d)(iii)	M1 (mixture becomes more) orange M2 forward reaction is endothermic M3 (mixture becomes more) orange M4 equilibrium moves (forwards/right) to compensate for extra acid / H^+
1(e)	M1 hydrolysis M2 $\text{CrF}_4 + 2\text{H}_2\text{O} \rightarrow \text{CrO}_2 + 4\text{HF}$